

even at high temperatures of around 200°C, and also a magnetic head incorporating the device. With coming hard disc drives being directed higher density recording, the temperature of the magnetic head in operating disc drives will be often high. The magnetic head of the invention is operable at such high temperatures. In addition, even when electrostatic discharge current flows into the MR or GMR device of the magnetic head, the pinned magnetization of the pinned magnetic layer in the device is not disturbed by it and is kept stable. In addition, since the shunt of sense current is small in the device, high resistance change is kept in the device to ensure good reproduction sensitivity. Therefore, with the magnetic head of the invention, much higher density recording is possible, and much higher reproduction output can be attained.

According to the seventh embodiment of the invention, the degradation of MR ratio in the spin valve films in thermal treatment such as annealing can be prevented, and, in addition, MR ratio in the device can be improved through improved specular reflection in the layers constituting the spin valve film in the device. Even when the free layer in the spin valve film in the device is thin, the interlayer between the MR-improving layer and the free layer is kept stable. Therefore, after thermal treatment, the electron transmission through the interface is kept high, and the spin valve film can maintain high MR ratio. Moreover, the magnetostriction in the free

layer of, for example, a Co-based magnetic material can be reduced by the MR-improving layer, and the microcrystalline structure of the free layer can be well controlled. With these advantages, the MR device of the invention is characterized by its high output power, few noise troubles and high thermal stability.

As has been described in detail hereinabove, the invention realizes high-performance and high-reliability MR devices, and its industrial advantages are great.

While the invention has been described in detail and with reference to specific embodiments thereof, it will be apparent to one skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope thereof.